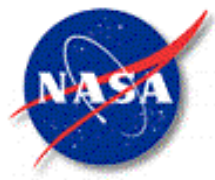


2<sup>nd</sup> Annual  
NASA Mirror Development  
Technology Days  
@  
MSFC

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(256) 544-0445



# Welcome

Welcome

## Important Information

Bathrooms

Photo Shoot – before lunch

Will Hold Time – apologies and cooperation

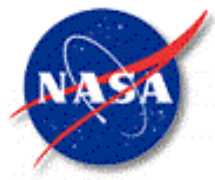
Friday Tours – load at Space and Rocket Center

Most Presentations will be available on MSFC/SOMTC Web Site

Thanks and Acknowledgements

Pat Puckett and Rita Keith

Schedule



## Team MSFC Mission Statement

Robust large-aperture low-mass mirrors, that can be rapidly and cost effectively fabricated, are critical for future NASA (space science, planetary & Earth resource) and DoD missions.

The MSFC Space Optics Manufacturing Technology Center (SOMTC) and its University/Industry Partners are actively developing new enabling techniques for the design, manufacture, test, modeling and control of such mirrors.



# Mirrors and Related Technologies

The purpose of NASA's mirror technology development program is to buy-down risk for current programs such as NGST as well as future missions.

Given the leverage exerted by mirror technology on system schedule & cost, small improvements in mirror technology maturity have large cost benefits.



## Beyond NGST

NASA's Origins and Structures and Evolution of the Universe (SEU) Themes have defined a series of future missions. Many require large optics that are more challenging than anything demonstrated to date.

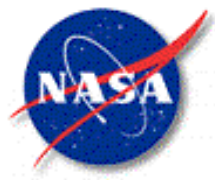
For Example:

Single Aperture Far-IR (SAFIR) requires a 10 meter segmented telescope diffraction limited at 10 micrometers actively cooled to 4K.

Space Ultra-Violet Observatory (SUVO) requires a 4 meter monolithic telescope diffraction limited at 0.2 micrometers.

Terrestrial Planet Finder (TFP) chromograph requires a monolithic 4 x 8 meter elliptical primary mirror.

Additionally, there are many challenging x-ray missions.



# Technology Days

Tech Days provides an open forum on the status of all NASA funded mirror development and related technologies.

This year's meeting includes presentations on:

- Advanced Mirror System Demonstrator (AMSD)

- NGST Mirror System Demonstrator (NMSD)

- Various SBIR and NRA contracts

- Cryogenic performance modeling

- AMSD test preparation including radius of curvature

- Results from a micrometeoroid impact upon mirror substrate study

- Recent cryogenic test results of various mirrors

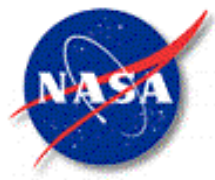


<b>Wednesday, May 22</b>	<b>Time</b>
Welcome	8:15
Ball Aerospace AMSD Progress Update	8:30
Goodrich Electro-Optical Systems AMSD Progress Update	9:00
Kodak AMSD Mirror Development Program	9:30
COFFEE BREAK	10:00
University of Arizona Progress Report on NMSD	10:20
COINMSD Hybrid Mirror Status	10:40
Xinetics Cryogenic Deformable Mirror Demonstrator	11:00
Group Photo	11:20
LUNCH	11:30
Contractor AMSD Ambient and Cryogenic Mirror Certification Test Plans	
Ball Aerospace AMSD Test Plans	1:00
Goodrich Electro-Optical Systems AMSD Test Plans	1:10
Kodak AMSD Cryogenic Test Plans	1:20
MSFC AMSD Ambient and Cryogenic Mirror Certification	
MSFC/UAH AMSD Test Plans	1:30
MSFC/UAH AMSD Figure Certification Plan	1:50
MSFC/UAH Radius of Curvature of Off-Axis Parabolooids	2:10
COFFEE BREAK	2:30
ORA Radius of Curvature Measurement Study Results	2:50
MSFC/UAH Leica Absolute Distance Meter	3:10
MSFC/UAH Full Aperture Cryo-Figure AMSD Modal Characterization	3:30
4D PhaseCAM Capabilities: Modal Analysis and Multiple-Wavelength Phasing	3:50
MSFC/UAH AMSD Reaction Structure Cryo Deformation Test	4:10
Kodak AMSD Cryo Actuator Testing	4:30
Ball Aerospace AMSD Actuator Cryo Test Plan	4:45



<b>Thursday May 23</b>	<b>Time</b>
MSFC Overview of AMSD Integrated Modeling and Analysis	8:00
MSFC Predicting Print-thru for the SBMD	8:20
SRS New & Improved Integrated Optical Design Analysis (IODA) Features	8:40
MSFC Materials Property Research	9:00
COFFEE BREAK	9:20
SAO/MSFC Micro-Meteoroids Effects on Glass & Beryllium Optics	9:40
Shock Transients Computer Models of Micrometeoroid Impact on Fused Silica	10:00
MSFC Space Environment Effects and Micrometeoroid Study	10:20
Schafer Silicon Lightweight Mirrors (SLMS) for UV and Extreme UV Imaging	10:40
SSG SiC Optical Systems in Space	11:00
Xinetics Large Low-Temperature SiC Mirror	11:20
POCO SuperSiC SiC Mirror for Cryo-Characterization	11:40
LUNCH	12:00
MSFC New Cryogenic Optical Test Capability at MSFC's SOMTC	1:30
Ball Aerospace SBMD Coating Test Results	1:50
MSFC 30K Test Results for Selected Mirrors	2:10
Brush-Wellman/Goodrich 0.5 m Joined Beryllium Mirror Demonstrator	
IABG 0.5 meter C/SiC Mirror	
Xinetics 0.5 meter SiC Mirror	
Kodak 0.23 meter SiO <sub>2</sub> Mirror	
COFFEE BREAK	2:50
HEXTEK Ultra-Lightweight Borosilicate Gas-Fusion Mirror for Cryo-Test	3:10
MER Developments in Hollow Graphite Fiber Technology	3:30
SRS Developments in Ultra Lightweight Membrane Optical Elements	3:50
Cornerstone Research Conformal Membrane Reflectors for Deployable Optics	4:10





<b>Friday May 24</b>			<b>Time</b>
Meet Tour Buses at Space and Rocket Center			8:30
<b>Tour Route #1</b>			
Tour Topic	Location	POC	
Segmented Telescope Test Bed	NSSTC	Bill Lightsey	9:00
Space Environment Lab	Building 4605	Ralph Carruth	9:45
Micrometeoroid Test Facility	Building 4612	Whitney Hubbs	10:15
XRCF	Building 4718	Cary Reily	10:45
<b>Tour Route #2</b>			
Tour Topic	Location	POC	
Space Environment Lab	Building 4605	Ralph Carruth	9:00
Micrometeoroid Test Facility	Building 4612	Whitney Hubbs	9:30
XRCF	Building 4718	Cary Reily	10:00
Segmented Telescope Test Bed	NSSTC	Bill Lightsey	10:45
Return to Space and Rocket Center			11:30